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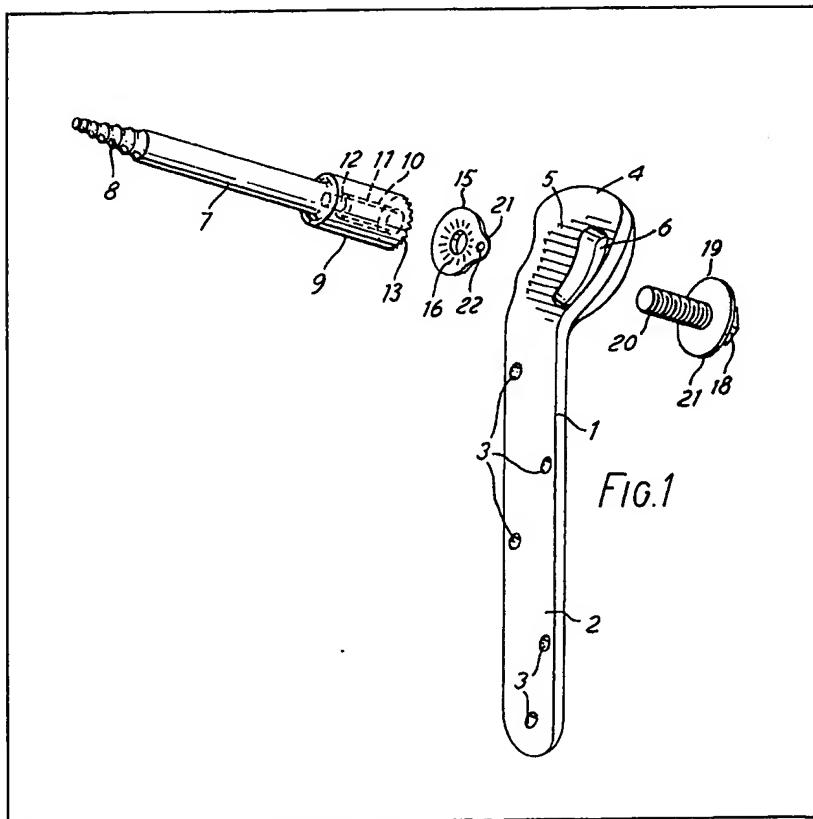
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(54) Device for treating trochanteric fracture

(57) A device for treatment of a trochanteric fracture of the upper femur comprises a plate, 1, for fixing to the upper part of the femur, a lag screw, 7, for connection to the head of the femur and means for rigidly securing the lag screw to the plate at different angles and for removing it from the plate the plate is fixed in position on the femur.



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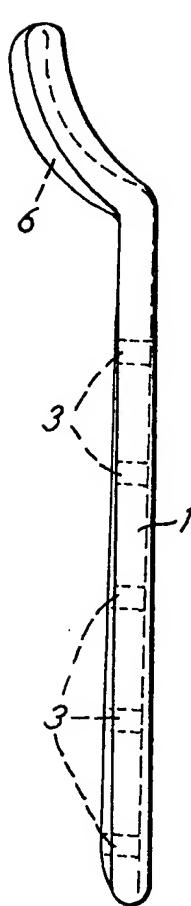
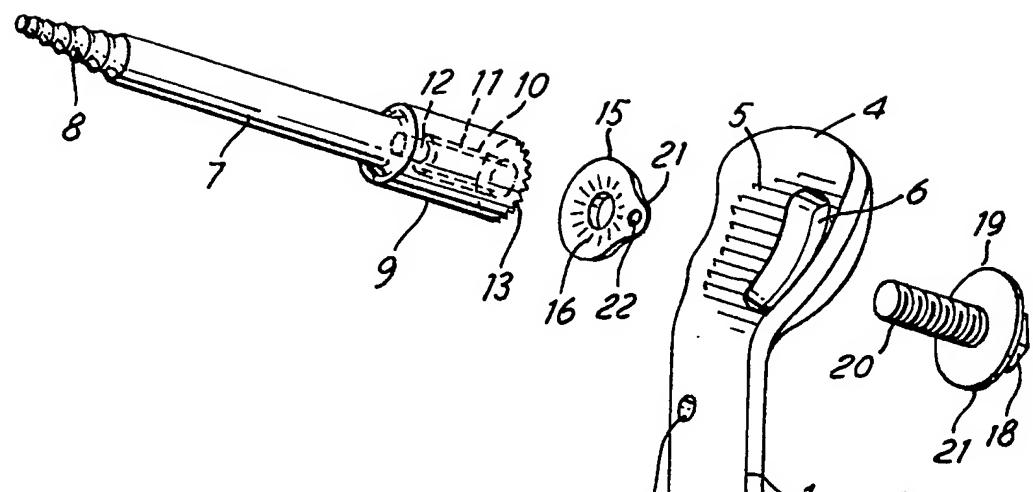


FIG. 2

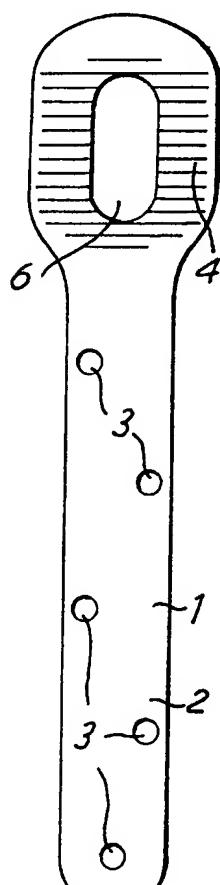


FIG. 3

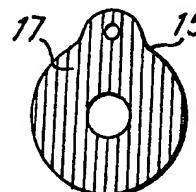


FIG. 4



FIG. 5

SPECIFICATION**Device for use in treatment of a trochanteric fracture of the upper femur**

5 This invention relates to a device for use in treatment of a trochanteric fracture of the upper femur.

It is known in the treatment of such fractures to use a plate which is adapted to be connected to the 10 upper part of the femur and which carries a projecting lag screw. It is necessary for the lag screw to be accurately connected to the plate at a predetermined angle to ensure that when the lag screw is screwed into the head of the femur to locate it in place the lag 15 screw carries the bearing weight. It is therefore necessary for the lag screw to be securely located on the plate.

A difficulty with known constructions is that the angle of the lag screw is preset and if, for some 20 reason, the screw becomes loose in the head it is necessary to remove the plate and screw before the device can be remounted on the femur with the screw at a different angle or at a different position to again accurately locate the head. Thus, the operation 25 entails the removal of the plate as well as the screw.

The present invention is intended to provide a 30 device from which the lag screw can be removed and repositioned in the head of the femur without removal of the plate from the bone concerned.

According to the present invention a device for use 35 in treatment of a trochanteric fracture of the upper femur comprises a plate component adapted for fixing to the upper part of the femur to be treated and a lag screw for connection to the head of the femur and means for rigidly securing said lag screw to the plate at different angles and for removing it from the plate when said plate is fixed in position on the femur with which it is to be used.

Preferably the securing means enable the lag 40 screw to be secured to the plate along an axis at angles in two different planes.

Again, the lag screw can be arranged to be secured at different angles in two different planes thus enabling wide range of angles and movement 45 to be achieved.

In a preferred construction the plate is provided 50 with an aperture through which said lag screw can pass and said securing means include a removable location member which co-operates with a head on the lag screw to prevent movement of the screw through the aperture when the removable location member is placed in position.

The head of the lag screw can be arranged to be 55 axially adjustable in relation to the location member when in position to enable the plate to be clamped between them and thus provide the rigid connection.

Thus, the location member can be provided by a 60 location washer which can be located behind an abutment on the lag screw, said location washer also engaging the plate.

Preferably the abutment and the washer can have 65 co-operating serrations as can the washer and the plate.

The head can be arranged to be removable from 70 the lag screw and thus it can be screw threaded

thereto.

With this arrangement the head can have a screw threaded shank which engages in a screw threaded bore in the screw and this bore can carry means to engage a suitable tool to allow the screw to be rotated.

In a preferred embodiment the portion of the plate which carries the lag screw is dished and projects angularly in relation to the part of the plate intended 75 for attachment to the femur. The engaging locator washer can also be dished to co-operate with it as can a flanged portion of the head.

The invention can be performed in many ways but one embodiment and one method of using the 80 device will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is an exploded view of the various parts of the device;

85 *Figure 2* is a side elevation of the plate for use with the device;

Figure 3 is a front elevation of the plate shown in Figure 2;

Figure 4 is a front elevation of the location washer; 90 and

Figure 5 is a side view of the washer shown in Figure 4.

As shown in the drawings the device for use in treatment of a trochanteric fracture of the upper 95 femur comprises a plate 1 which is adapted for fixing to the upper part of the femur to be treated. The plate comprises a shank portion 2 which is slightly cambered to adapt it to the bone and which carries five screw holes 3 to enable it to be secured in position in known fashion. The plate can be manufactured in various lengths and have any number of desired screw holes to fit various patients.

The upper end 4 of the plate 1 projects angularly in 100 relation to the shank 1. This part of the plate is dished and carries serrations indicated by reference numeral 5. An aperture in the form of an elongated slot 6 is provided in the dished portion of the plate and is wider than the largest dimensions of a lag screw 7. This lag screw has a tapered screw thread 8 at one end and is provided with a boss 9 at the other end. This boss 9 has a bore 10 which carries a screw thread 11 and has a hexagonal socket 12 to receive an allen key in a manner to be described. The end of the boss 9 acts as an abutment and is serrated as indicated by reference numeral 13.

110 Means for rigidly securing the lag screw to the plate comprise a removable location member in the form of a location washer 15 which is dished and which has serrations 16 which can co-operate with serrations 13 on the abutment end of the lag screw and parallel serrations 17 on its other side which can co-operate with serrations 5 on the plate 1.

115 A removable bolt head 21 comprises a head 18 of hexagonal shape to receive a spanner, a dished flange 19 rigidly secured thereto and a screw threaded shank 20.

When the device is to be used the plate 1 is rigidly 120 secured to the femoral shaft by suitable screws passing through the holes 3. The lag screw is now passed through the slot 6 and located in the head of

- the femur in known manner and by rotating it with an allen key located in the hexagonal socket 12. It will be appreciated that the screw can be passed through the slot 6 at various angles in different planes to achieve the best location position. The bolt head 21 is now screw threaded into the bore 10 but prior to insertion the washer 15 is located on the shank 20 of the head so that it nests with its serrations 17 against the serrations 5 on the plate.
- Further tightening of the head now pulls the serrations 13 against the serrations 16 on the washer and the head is finally tightened, the engaging serrations assuring that the angle of the lag screw is fixed and the screw is rigidly secured to the plate.
- In order to assist handling of the washer a small lug 21 with a hole 22 is provided. This projecting lug enables the washer to be held by an appropriate instrument when it is inserted or removed during use of the device.
- The flange 19 of the bolt head 21 fits the curve of the dished outer surface of the part 4 of the plate and the shank 20 may have a nylock self-retaining device to prevent the head unfastening.
- As the lag screw 7 and the plate are rigidly held together the loading on the bone is all carried through the lag screw and the plate which thus helps prevent displacement of the fracture.
- Should the lag screw displace within the bone or penetrate the femoral head and thus impinge on the acetabulum during movement of the hip it is possible to reposition it without disturbing the plate which is firmly screwed to the upper part of the femur. Thus, the lag screw 7 can be removed through the slot 6 once the head 17 has been loosened and the dish shaped washer 15 removed. Thus, a revision operation is a much less serious operation both from the patient's and the surgeon's point of view than it would be if the plate had to be completely unscrewed from the femur and the whole device repositioned as is normal with conventional nail plate fixation systems.
- Once the lag screw has been removed it can be repositioned in the head to the femur and again fastened up in the manner described above. Thus, a whole range of positions in both plane can be achieved or altered without disturbing the plate.
- plate is provided with an aperture through which said lag screw can pass and said securing means includes a removable location member which co-operates with a head on said lag screw to prevent movement of the screw through the aperture when it is placed in position.
- A device as claimed in claim 4 in which the head of said lag screw is axially adjustable in relation to said location member when in position to enable said plate to be clamped between them.
- A device as claimed in claim 5 in which location member is in the form of a location washer which can be located behind an abutment on the lag screw, said location washer also engaging the plate.
- A device as claimed in claim 5, 6 or 7 in which said abutment and said washer have co-operating serrations.
- A device as claimed in claim 5, 6 or 7 in which said washer and said plate have co-operating serrations.
- A device as claimed in claim 5, 6, 7 or 8 in which said head is removable from said lag screw.
- A device as claimed in claim 9 in which said head is screw threaded to said lag screw.
- A device as claimed in claim 10 in which said head has a screw threaded shank which engages in a screw threaded bore in the screw, said bore carrying means to engage a suitable tool to allow the screw to be rotated.
- A device as claimed in any one of the preceding claims in which the portion of the plate which carries the lag screw is dished and projects angularly in relation to the part of the plate intended for attachment to the femur.
- A device as claimed in claim 12 in which the location washer is also dished as is a flanged portion of said head.
- A device for use in treatment of a trochanteric fracture of the upper femur substantially as described herein with reference to and as shown in the accompanying drawings.

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CLAIMS

1. A device for use in treatment of a trochanteric fracture of the upper femur comprising a plate component adapted for fixing to the upper part of the femur to be treated, a lag screw for connection to the head of the femur and means for rigidly securing said lag screw to the plate at different angles and for removing it from the plate when said plate is fixed in position on the femur with which it is to be used.
2. A device as claimed in claim 1 in which said securing means enables the lag screw to be secured to the plate along an axis at angles in two different planes.
3. A device as claimed in claim 2 in which said lag screw can be secured at different angles in two different planes.
4. A device as claimed in claims 1-3 in which said